Highways for LIFE (HfL) Pilot Program

WHITE PAPER

Introduction

This white paper presents the proposed implementation plan of Section 1502 of SAFETEA-LU for the Highways for LIFE (HfL) Pilot Program. It was written to offer an opportunity for comment into the development of the final implementation document.

The goal of the Highways for LIFE pilot program is to significantly enhance the American driving experience by improving safety and highway quality and reduce congestion caused by construction. The program proposes to accomplish this through accelerating the adoption of proven - but infrequently used - technologies. Specifically, this will be accomplished through technology transfer, information dissemination, technology partnerships, stakeholder input and involvement, monitoring and evaluation and incentive funding of Federal-aid highway demonstration projects to showcase innovation and new technology.

Background

On February 8, 2003, then USDOT Deputy Secretary Michael P. Jackson challenged the Federal Highway Administration (FHWA) to propose a way to dramatically improve the Nation's highway system in just few years. As a result, the FHWA developed a concept it called "Highways for **LIFE"** (with "LIFE" and acronym for **L**ong-lasting highways using **I**nnovative technologies and practices to accomplish **F**ast construction of **E**fficient and safe pavements and bridges). The central idea of the concept was to identify under-utilized, but proven technologies that would accelerate construction, improve safety, lower congestion and extend the life of highway projects and then expedite their adoption to standard practice. Currently, such a successful adoption process can require not just years, but decades.

In the summer of 2003, a series of stakeholder meetings were held to evaluate the concept and collect valuable input to assist in the development of the concept. In September of that year, the FHWA Highways for LIFE Team was established to develop the program and undertake outreach efforts to others in the highway community.

The recently passed law, SAFETEA-LU, directs the Secretary of Transportation to establish and implement the "Highway for LIFE Pilot Program". In that regard, the FHWA will act on the Secretary's behalf in accomplishing many of the activities required.

To fund the effort, SAFETEA-LU, Section 1101(a)(20) established program total funding at $75,000,000 through 2009, including $15,000,000 for fiscal year 2006, and $20,000,000 for each year of fiscal years 2007 through 2009. This funding includes incentive grants for a qualifying demonstration project of up to 20%, but not more than $5 million of the total cost. A maximum

of 15 projects may receive incentive funds in any fiscal year. Up to 100% Federal share is also allowed on HfL demonstration projects. There is a goal of providing funds for at least one project in each State by 2009. A State may also use up to 10% of its Interstate Maintenance, National Highway System, Surface Transportation Program, and Congestion Mitigation and Air Quality Improvement Program funds for HfL eligible projects as matching funds.

The FHWA is interested in the views of the States, industry and other interested parties on the proposed implementation of the HfL Pilot Program therefore the purpose of this notice is to invite comments on the program.

HfL Program Overview

The HfL program is intended to foster changes that will improve the safety and performance of our highways and reduce the impact of construction and maintenance on highway users. The plan to implement the program is to accelerate the use of under-utilized, proven technologies that will improve safety, quality and congestion through the education, training and demonstration of transportation practitioners.

The HfL objectives are to**:**

Improve Safety: The emphasis is to improve safety during construction for the both the highway user and construction workers as well as improving the safety of the highway after construction is completed.

Reduce construction-related congestion: The emphasis is focused on reducing the frequency and severity of disruptions to the free-flow of traffic caused by construction operations.

Improve quality: The emphasis is on improving those aspects of highway system performance the highway user experiences directly. It includes, but is not limited to, comfort, efficiency, performance over time, durability, and lack of interference from construction and maintenance operations.

Program Elements

SAFETEA-LU Section 1502 paragraphs (b) through (f) describes the activities or elements of the HfL Pilot Program. The following paragraphs present the FHWA's understanding of the purpose and proposed implementation approach for the HfL program elements:

Stakeholder Input and Involvement

The HfL stakeholders include owners, builders, suppliers, consultants, academia, the highway users (commercial motor carriers, motorists and passengers) and those impacted by highways (neighbors and adjacent landowners). Through stakeholder input and involvement, FHWA desires to discuss, clarify, refine and adjust the approach and implementation of the HfL program

as well as to build ownership for the program. Stakeholder input and involvement would be an ongoing element of the HfL program in order to assess the progress of the program, consider appropriate redirection in light of progress and in the assessment of the overall program results and outcomes.

Stakeholders would have opportunities to provide input on the Highways for LIFE Implementation plan, and the conduct of the program, including:

- The Highways for LIFE performance goals
- Applicable technologies and practices
- Technology partnerships approach
- Evaluation of Highways for LIFE outcomes and benefits including demonstration projects, technology partnerships, technology transfer and information dissemination.

The FHWA is considering a multi-tiered stakeholder input and involvement approach for the Highways for LIFE program. Informing and soliciting feedback would happen routinely through notices published in the Federal Register, presentations at numerous highway community meetings, and the establishment of a communications interchange site, or "Community of Practice" on the HfL Internet website http://www.fhwa.dot.gov/hfl/.

Historically, the FHWA has asked the Transportation Research Board (TRB) to establish stakeholder input committees for research and technology initiatives. Consideration is being given to request that TRB establish a stakeholder committee to provide input to the structure and conduct of the HfL Program.

Performance Goals

Paragraphs (a) (3) and (b) (4) (A) of Section 1502 make reference to "performance standards." Since the term "standards" already has specific implications within the highway community outside of those outlined in the legislation, a more appropriate term for use in the HfL program is "performance goals."

The HfL Performance Goals define the desired end result in the program's three objectives of improved safety, reduced congestion due to construction and improved highway quality. The FHWA chose Performance Goals to put the emphasis on the highway motorist and user needs, to foster the acceptance and adoption of innovations (innovations is used in the broadest sense and includes technologies, practices, procedures, contract administration, and financing) and to reinforce the need to address all three goals—safety, congestion, and quality—in every project.

The individual HfL Performance Goals would be set at levels representing the best the highway community has and is able to produce. Statistical data for measurement of some performance goals are currently readily available; additional data collection will be necessary to measure some performance goals. Projects built, as part of the HfL program, would adopt the Performance Goals in each of the three goal areas.

The three performance goals being considered for the first year of HfL projects are:

Safety

- Work Zone Safety During Construction--work zone crash rate 20 percent less than State-wide average;
- Worker Safety During Construction--worker injury rate 20 percent less than the most recent National average;
- Facility Safety After Construction—20 percent reduction in fatalities and injuries as reflected in 3-year average crash rates, using pre-construction rates as the baseline.

Construction Congestion

- Travel Time During Construction-- less than 10 percent reduction in the average preconstruction speed using 100 percent sampling; or
- Queue Length During Construction--0.5 mile or less for speeds less than 10 mph or 1.5 miles or less moving queue for travel speed 20 percent or less than the posted speed limit.

Quality

- Smoothness-- Inertial Profile, International Roughness Index (IRI) less than 0.80 m/km
- Noise-- Close Proximity (CPX) noise measurement, less than 94.0 decibels

The FHWA is interested in feedback concerning the application of the HfL Performance Goals and specifically the following:

- Should the above-proposed Performance Goals be applied universally to all HfL-funded projects?
- Should the Performance Goals be adjusted to consider project factors such as class of road, traffic volume, cost of the project, size of the project, current project conditions as related to safety, congestion and quality, etc?
- Should the Performance Goals be adjusted to consider State DOT factors such as the current State-wide average conditions for safety, construction congestion and quality, the current State-wide average conditions for that class of road, or the current design standards and construction specifications, etc?

Projects

The purpose of the HfL-funded construction projects is to demonstrate on actual projects and to document the potential improvements in safety, construction-related congestion and quality that can be achieved through the application of innovations. The demonstration will involve showing the highway community, the public, and mass media how the HfL projects are built and perform. Widespread demonstration of successes will, in turn, provide the impetus for more widespread application of the performance goals and innovations in the future. Documentation will involve collecting the facts and figures of before, during, and after construction conditions, costs, results, outcomes, and benefits. One of the uses of the documentation will be in teaching the HfL concepts to the highway community.

Solicitation

An annual solicitation for HfL projects is anticipated beginning in calendar 2006. The FHWA would publish a notice in the Federal Register requesting submittal of project applications. The announcement would be publicized through various other means, including posting it on the World Wide Web, providing facilitation by the FHWA Division Offices, and through outreach to the States. All applications would be submitted electronically by the State DOTs to the requesting FHWA Division Office.

Eligibility Criteria

- The project must be eligible for funding under Chapter 1 of Title 23, United States Code of Federal Regulations.
- The project incorporates innovations (leading to the adoption of new practice) to improve safety, reduce congestion due to construction, and improve quality.
- The submitting transportation agency agrees to:
  (a) Adopt all applicable HfL Performance Goals for the project;
  (b) Provide the information needed to evaluate the project and innovations. Additional costs incurred as a result of supplying this information to FHWA would be an eligible project expense; and
  (c) Participate in subsequent Technology Transfer and Information Dissemination activities associated with the project. This participation might include such things as conducting an "open house" event on the project, providing information for success stories, and providing briefings on the success of the technology.

Evaluation

The FHWA would evaluate the project applications based on the following factors:
- How well the project would achieve the HfL Performance Goals for safety, reduced construction congestion and quality;
- The type(s) of innovation(s) proposed;
- The implementation of applicable Performance Goals; and
- The probability that the proposed innovation(s) would lead to improvements in the administration of the State's transportation program.
- The diversity of innovations, project type, size and cost, and location.

Selection

Selection of projects would be based upon:
- The results of the evaluation process;
- The assurance of a broad range of innovations;
- The assurance of a wide variety of project types;

- A goal that each State receives funding for at least one project (considering that they must meet basic eligibility criteria); and
- Are or will be ready for construction within 12 months of approval of the project proposal.

Number of Projects

Section 1502 establishes a maximum 15 projects per year that may receive HfL funding. However, it is silent on the number of projects that could be constructed with 100 percent Federal funding. In considering such factors as the purpose and scope of the program and the various associated costs and activities needed for each HfL construction project to contribute to the desired outcome, it is proposed that the total number of HfL projects be kept at 15 per year, with the understanding that FHWA may consider adding a few projects per year to take advantage of unique opportunities.

Technology Partnerships

Within the HfL Pilot Program, Technology Partnerships can be formed to foster the development, improvement and creation of innovative technologies and facilities. FHWA would enter into formal agreements with public or private organizations to jointly fund or otherwise participate in adapting and/or making market-ready innovations to support the HfL Pilot Program goals. These agreements may be with traditional players in the highway construction business or other organizations, which have promising innovations that can be made ready for timely implementation.

The HfL Technology Partnerships have a two-fold purpose. First, they are intended to foster the implementation of under-utilized innovations that will improve the safety and speed of highway construction and the safety characteristics, quality and durability of pavements and bridges. Second, they provide an opportunity for those not involved in construction of the HfL projects to participate in, contribute to, and benefit from the program. The HfL Technology Partnerships would provide financial impetus needed to move some of the many proven but underutilized market-ready innovations and methods into practice in the highway industry. Innovations brought forward through the Technology Partnerships may be used in the HfL Projects and promoted through HfL Technology Transfer and Information Dissemination.

To be considered for participation, the innovation must have been used successfully in highways, transportation or in some related venue in the U.S. or internationally and have a clear potential for successful use in the United States highway industry.

A detailed approach to Technology Partnerships has not yet been developed because this is an area where stakeholder and industry input is needed. The process used in the U.S. Department of Transportation's Small Business Innovation Research (SBIR) Program[*] is seen as one possible model for the Technology Partnerships. However some deviations may be necessary, since the Technology Partnerships focus on proven technologies, rather than research. The FHWA is

[*] For more information on the U.S. DOT Small Business Innovation Research (SBIR) Program go to the following URL: http//www.volpe.dot.gov/sbir/

interested in feedback on approaches to Technology Partnerships. Due to the desire to obtain input and the reduced level of funding in the first year of the HfL program it is proposed that funding for Technology Partnerships would begin in Fiscal Year 2007.

Technology Transfer

Technology Transfer is focused on accelerating the rate of adoption of these proven but under-utilized technologies. The purpose of the Technology Transfer initiative is to inform, motivate, enable and equip the highway community workforce to more efficiently deliver projects that meet the HfL pilot Program goals. Components of Technology Transfer may include technology training for both public and private sector personnel, a knowledge exchange website where practitioners can log on and share ideas, peer exchange, as well as technology workshops and HfL project showcases demonstrating the actual use of the technology.

Within the HfL Program, the challenge of enhancing technology transfer goes beyond the actual innovations technologies. As previously mentioned, technology transfer and the resulting widespread adoption of an innovation in the highway community routinely takes decades. Highways for LIFE would like to change that paradigm.

To maximize the potential for success of the HfL Technology Transfer initiative, a focus is proposed on one technology in each of the areas of safety, congestion and quality. These three technologies would need to be National in scope and have the potential for significant benefits to the highway community and highway users. However, beyond the benefits from the actual implementation of the three technologies is the potential for creating a technology transfer model and process that will result in enhancing the way numerous other innovations are adopted by the highway community. FHWA has identified three technologies that meet the HfL criteria: Prefabricated Bridge Systems and Elements, Road Safety Audits, and "Making Work Zones Work Better," a concept which includes an entire suite of innovations. These technologies were selected for their ability to address the three objectives of Highways for LIFE as well as to showcase the Highways for LIFE approach for accelerating the delivery of innovation and new technology.

Additional Technology Transfer activities will be innovations workshops for each HfL-funded project. The workshops will be similar in scope and structure to the Accelerated Construction Technology Transfer workshops sponsored by the American Association of State Highway and Transportation Officials and FHWA.

A detailed plan for Technology Transfer has not yet been developed because, again, this is an area where stakeholder and industry input is needed. Therefore, the FHWA is interested in feedback on specific topics, approaches and delivery methods for Technology Transfer.

Information Dissemination

An essential component of transferring technology is Information Dissemination, including the communication of the HFL goals, concepts and services. Communicating the HfL story is critical for several reasons: First, without a high level of communication, there would be no "technology

transfer;" innovative approaches would remain with those people who initially employed them. Second, recounting others' successes tends to instill a higher level of competition and peer-pressure to keep up with the rest of the community. Third, telling the public about the highway community's push for better roads and the HfL projects builds goodwill and shows an appropriate level of responsiveness to the public's need and that the highway community is being a good steward of the public trust. It also has the potential to show highway builders the benefits of using HfL approaches on more of their projects.

The purpose of the HfL Information Dissemination program is to inform, motivate and involve the highway community and public in the HfL goals, performance goals, projects, technology partnerships, technology transfer, stakeholder input and involvement activities, results, benefits and outcomes. The scope of the HfL Information Dissemination program includes the highway community, academia, associated industries and private sector groups, the public and the international highway community.

A key component of Information Dissemination would be highway construction success stories, which are intended to expand awareness and inform the States, industry and FHWA field offices on how innovation can improve safety, reduce construction-related congestion, and improve quality, and why it is beneficial to pursue non-traditional approaches and innovations. To be considered an HfL success story, a project must have resulted in improvements in safety, reduced construction congestion, reduced construction time, improved quality and/or reduced costs.

HfL Information Dissemination would be accomplished using such communication tools as publications, videos, presentations, the Internet, and a web-based Community of Practice, as well as project showcases, technology partnerships, technology transfer and/or stakeholder input and involvement.

The FHWA has not developed a detailed plan for Information Dissemination transfer because this is an area where stakeholder and industry input is needed. Therefore, FHWA is interested in feedback on specific topics, audiences, messages, approaches and delivery methods for Information Dissemination.

Monitoring and Evaluation

To assess the accomplishments and implement improvements to the HfL pilot program, it will be necessary to collect data for analysis. This will be designated the Monitoring and Evaluation element of the HfL pilot program.
The Monitoring and Evaluation effort will be used to fully describe and quantify the outputs, results and outcomes in the three goal areas and to provide an assessment of the benefits derived from the investment. The resulting information would serve as a resource to highway program decision makers on the value of the innovations demonstrated in the HfL program, help maintain the momentum needed to achieve the HfL goals, and demonstrate the value of the pilot program.

The Monitoring and Evaluation element would encompass all HfL elements. For the Projects, information collected prior to, during, and after construction would include a full array of highway condition, financing, design, contracting, construction, operations, and safety data as

well as user statistics and opinions. The costs, outcomes, impacts, and benefits of the Technology Partnerships would also be fully documented. To the extent possible, information collected for the Technology Transfer and Information Dissemination would include objective measures of the effectiveness and impact of the individual activities that are undertaken, in addition to information on the cost of those activities.

The FHWA has the lead for Monitoring and Evaluation, and would be responsible for data collection, data storage and access, analysis and reporting. The owners of HfL-funded projects would supply or provide access to data and information. Costs associated with these activities are an eligible project expense. The FHWA Division Offices would serve as points of contact and coordination between the FHWA's contractor(s) and the State.

Spending Plan

The approximate level of funding for each of the HfL program elements is 60 percent for Projects, 30 percent for Technology Transfer and 10 percent for the remaining elements of Technology Partnerships, Information Dissemination, Stakeholder Input and Involvement. The approximate distributions would include the costs for Monitoring and Evaluation. This proposed spending plan would be evaluated yearly and adjusted accordingly.

Next Steps

The FHWA is gathering input and formulating its implementation strategy for publication in the Federal Register. A Stakeholder meeting with the initial organizations the US DOT Secretary Mineta and former FHWA Administrator Peters briefed in July 2003 is planned in early October, 2005. Based on their input and the input received from the outreach to the FHWA, this white paper will be revised and form the basis for the Federal Register Notice.

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